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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,682	12/28/2001	Daniel P. Johnson	(256.114US1)	7301
128	7590	01/30/2006		
HONEYWELL INTERNATIONAL INC. 101 COLUMBIA ROAD P O BOX 2245 MORRISTOWN, NJ 07962-2245				
			EXAMINER MEINECKE DIAZ, SUSANNA M	
			ART UNIT 3623	PAPER NUMBER

DATE MAILED: 01/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/032,682

Applicant(s)

JOHNSON, DANIEL P.

Examiner

Susanna M. Diaz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/28/01</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-20 are presented for examination.

#### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

35 U.S.C. § 101 requires that the claims produce a final result that is useful, concrete, and tangible.

According to the utility requirement, the claimed invention has to be specific, substantial, and credible. Claims 1-20 are directed toward a mathematical formula without any specific, substantial, or credible result. The formula is never applied to yield a practical application. While claims 2-5 recite that the solution is a schedule for a manufacturing process, a schedule for operating an oil refinery, a plan for a manufacturing process, and a plan for operating an oil refinery, respectively, the claimed invention does not clarify how the mathematical operations are specifically adapted to yield a specific, substantial, or credible result in relation to a schedule or plan for a manufacturing process or for operating an oil refinery.

As per the tangibility requirement, the claimed invention must set forth a practical application that produces a real-world result. As discussed above, the claimed invention recites a mathematical formula without applying the formula to a specific

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practical application with a real-world result. Even though claims 2-5 generally recite potential applications of the mathematical formula, there is never any express connection made between the equations and how they yield any results relevant to scheduling or planning. In other words, it is never made clear how the recited equations are adapted to a real-world application. Without relating the equation variables to a particular application that yields a result specific to that application, the equations are meaningless in a real-world context.

Regarding the concreteness requirement, the claimed invention must produce a result that is substantially repeatable or reproducible. Again, as discussed above, there is no meaningful result produced by the claimed invention. Consequently, the mathematical formula *per se* is abstract and, without any understanding of what the recited variables represent, the results of the claimed invention are not substantially repeatable or reproducible.

Claims 1-20 fail to produce a useful, concrete, and tangible result and are therefore deemed to be non-statutory.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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5. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding the concreteness requirement under 35 U.S.C. § 101, the claimed invention must produce a result that is substantially repeatable or reproducible. As discussed above, there is no meaningful result produced by the claimed invention. Consequently, the mathematical formula *per se* is abstract and, without any understanding of what the recited variables represent, the results of the claimed invention are not substantially repeatable or reproducible. The Examiner has looked toward the specification for clarification of an intended practical application. While the specification generally states that the invention is used for scheduling or planning and provides some examples of specific applications (pages 4-11 of the specification), the details of the mathematical equations used as part of the invention as addressed on pages 11-42 of the specification are very generic in nature and never explain the significance of each variable with respect to each possible application of the equations. Consequently, one of ordinary skill in the art would not have known at the time of Applicant's invention how to make and/or use Applicant's intended invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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7. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-20 are directed toward solving equations that are based on variables, relationships, and constraints that are never explicitly defined. Consequently, the intended metes and bounds of the claimed invention cannot be assessed. Without any particular context attributed to these variables, relationships, constraints, and equations, the scope of the claimed invention is ambiguous. The claims are very nebulous and abstract in nature; therefore, the Examiner is unable to focus on a clear and defined invention. For example, claims 2-5 recite that the solution is for a schedule or plan. How is a schedule or plan created merely by solving a set of non-convex equations and determining whether a solution is optimal, feasible, or infeasible. How is such an analysis applied to produce meaningful results in relation to a schedule or plan?

Please clarify the intended scope of the "global subdivision search." Does this term refer to an algorithm or mathematical operation invented by Applicant or is it a synonym for a well-known algorithm or mathematical operation, such as one relating to subdivision and global optimization or branch-and-bound algorithms for global optimization? For examination purposes, it will be assumed to be one of the well-known options.

Under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, Applicant is required to clearly point out and distinctly claim the intended invention. This requirement has not been met.

Appropriate correction is required.

*In light of the numerous rejections under 35 U.S.C. § 101 and 112, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs, the following art rejection reflects Examiner's best understanding of the claimed invention.*

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hillier et al. (Introduction to Operations Research (6<sup>th</sup> ed)).

The claimed invention recites various old and well-known optimization techniques in the area of operations research, without any specific details of how these techniques are applied to a particular problem. The claimed techniques are addressed throughout Hillier. The table of contents and index as well as chapters 2, 3, and 13 have been provided to show the core concepts addressed by the claimed invention.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Visweswaran, V. and C.A. Floudas. "A Global Optimization Algorithm (GOP) for Certain Classes of Nonconvex NLPs: II. Application of Theory and Test Problems" (from

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<http://titan.princeton.edu/papers/vishy/cche2.ps>). Department of Chemical Engineering, Princeton University, April 1990/Revised July 1990 – Discloses a global optimization algorithm for nonconvex problems with linear and nonconvex constraints.

Esposito, William R. and Christodoulos A. Floudas. "Global Optimization of Nonconvex Problems with Differential-Algebraic Constraints." European Symposium on Computer Aided Process Engineering, 10<sup>th</sup> Computer Aided Chemical Engineering Conference, May 2000 – Discloses the global optimization of nonconvex problems.

Lamba, Nitin, Mark Dietz, Daniel P. Johnson, and Mark S. Boddy. "A Method for Global Optimization of Large Systems of Quadratic Constraints" (from the Global Optimization and Constraint Satisfaction Conference, Second International Workshop, COCOS 2003). Honeywell Laboratories and Adventium Labs, November 2003 – Discloses an article co-authored by the Applicant and associated with the assignee of the instant application, but dated after the filing of the instant application.

Boddy, Dr. Mark S. and Dr. Daniel P. Johnson. "A New Method for the Global Solution of Large Systems of Continuous Constraints" (from the Global Optimization and Constraint Satisfaction Conference, First International Workshop, COCOS 2002), Adventium Labs and Honeywell Laboratories, October 2002 -- Discloses an article co-authored by the Applicant and associated with the assignee of the instant application.

Goldman, Robert P. and Mark S. Boddy. "A Constraint-Based Scheduler for Batch Manufacturing." IEEE, pages 49-56, January-February 1997 – Discloses a scheduler that utilizes a constraint envelope scheduling methodology as part of Honeywell's batch scheduling process.

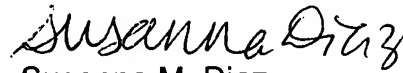


Boddy et al. (WO 00/28451) – Discloses an automated finite capacity scheduler assigned to Honeywell, Inc., the assignee of the instant application.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susanna M. Diaz whose telephone number is (571) 272-6733. The examiner can normally be reached on Monday-Friday, 10 am - 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Susanna M. Diaz  
Primary Examiner  
Art Unit 3623

January 19, 2006